

What is claimed is:

1. An apparatus for cooling a non-uniformly heated integrated circuit, the integrated circuit having at least one low-power region and at least one high-power region, the apparatus comprising:

- 5           a. at least one inlet for a coolant, the inlet being connected with a high-power region of the integrated circuit;
- b. means for transferring the coolant from the high-power region to a low-power region of the integrated circuit; and
- c. at least one outlet for the coolant, the outlet being connected to the low-power  
10           region of the integrated circuit.

2. The apparatus as recited in claim 1 wherein the coolant is a single phase coolant.

3. The apparatus as recited in claim 1 wherein the coolant is a two phase coolant.

- 15           4. The apparatus as recited in claim 1 wherein the means for transferring the coolant comprises a chamber, the chamber being connected to the inlet and the outlet, the chamber being in close contact with the integrated circuit.

- 20           5. The apparatus as recited in claim 4 wherein the chamber is made of high thermal conductivity material.

6. The apparatus as recited in claim 4 wherein the chamber has channels for directing the coolant.
7. The apparatus as recited in claim 1 further comprising a pump for introducing the  
5 coolant into the integrated circuit, transferring the coolant from the high-power region to the low-power region of the integrated circuit and removing the coolant from the integrated circuit.
8. A method for cooling a non-uniformly heated integrated circuit, the integrated circuit  
10 having at least one low-power region and at least one high-power region, the method comprising the steps of:
  - a. introducing a coolant in a high-power region of the integrated circuit;
  - b. transferring the coolant from the high-power region to a low-power region of the integrated circuit; and
  - 15 c. removing the coolant from the low-power region of the integrated circuit.
9. The method as recited in claim 8 wherein the coolant is introduced parallel to the plane of the integrated circuit.
- 20 10. The method as recited in claim 8 wherein the coolant is introduced perpendicular to the plane of the integrated circuit.

11. An apparatus for cooling a non-uniformly heated integrated circuit, the integrated circuit having at least one low-power region, at least one moderate power region and at least one high-power region, the apparatus comprising:

- 5           a. at least one inlet for a coolant, the inlet being connected with a high-power region of the integrated circuit;
- b. means for transferring the coolant from the high-power region to a moderate power region of the integrated circuit;
- c. means for transferring the coolant from the moderate power region to a low-power region of the integrated circuit; and
- 10          d. at least one outlet for the coolant, the outlet being connected to the low-power region of the integrated circuit.

12. A method for cooling a non-uniformly heated integrated circuit, the integrated circuit having at least one low-power region, at least one moderate power region and at least one high-power region, the method comprising the steps of:

- 15           a. introducing a coolant in a high-power region of the integrated circuit;
- b. transferring the coolant from the high-power region to a moderate power region of the integrated circuit;
- c. transferring the coolant from the moderate power region to a low-power region of the integrated circuit; and
- 20          d. removing the coolant from the low-power region of the integrated circuit.

13. An apparatus for cooling a non-uniformly heated heat source, the heat source having at least one low-power region and at least one high-power region, the apparatus comprising:

- a. at least one inlet for a coolant, the inlet being connected with a high-power region of the heat source;
- b. means for transferring the coolant from the high-power region to a low-power region of the heat source; and
- c. at least one outlet for the coolant, the outlet being connected to the low-power region of the heat source.

14. A method for cooling a non-uniformly heated heat source, the heat source having at least one low-power region and at least one high-power region, the method comprising the steps of:

- a. introducing a coolant in a high-power region of the heat source;
- b. transferring the coolant from the high-power region to a low-power region of the heat source; and
- c. removing the coolant from the low-power region of the heat source.